DISTRIBUTION METHODS FOR DISTRIBUTING AND DISPENSING BEVERAGES AND LIQUID FOOD PRODUCTS

This invention relates to methods for distributing and dispensing beverages and liquid food products.

Bottled water distribution is one of the most important markets in the food industry, with a value in the billions of US dollars.

Currently, bottled drinking water is distributed to customers using large polycarbonate bottles. Such bottles traditionally hold 15-19 litres of product and, correspondingly, weigh between 15-19 kg. These bottles are recycled but the hygiene practices necessary to provide some measure of integrity pose an ongoing problem for the industry.

Hygiene is a major consideration. Maintaining the HACCP (Hazard and Critical Control Points) system when a bottle has been used by a consumer, returned without a cap and subsequently stored by a retailer prior to washing and sterilising the bottles is difficult. It is difficult to monitor whether the bottle has been put to storage of toxic substances or substances incompatible with the safe distribution of bottled water. Contamination is a difficult problem to detect prior to consumption. Taint/discolouring or chemical after taste of water are familiar problems.

Second, usage of the large polycarbonate bottles pose risk of injury to personnel distributing the bottles or customers of drinking water supplied in the bottles. If the bottles fall, they may cause significant injury. This raises a significant occupational health and safety issue.

Third, storage, transportation and recovery of bottles creates significant expense. If bottles are trucked to distribution points and customers, by larger trucks, as is usual practice, the biggest cost issue is the Cubic Metre rate charged for empty or full cages with wasted area due to the round bottles. Rising fuel prices do not assist. Such trucks may also require a lifting device to cope with the heavy bottles. Usage of caged trucks may also create exposure to dust/oil etc and other forms of airborne contaminants whilst the bottles are on the tray of the truck. This may lead to product of unhygienic quality. There is thus an overlap between the contamination problems discussed above and the transport economics issue.

Fourth, polycarbonate or like bottles are typically provided with a plastic seal or cap that the customer or operator must remove prior to placing the bottle in a dispenser. Spillage and wastage of drinking water may result as a bottle is inverted and placed into a dispensing position in the dispenser. Insects, airborne bacteria and dust may also pollute the water at this point making it unhygienic.

It is an object of the present invention to provide methods and devices for distributing and dispensing beverages, such as drinking water, to customers that address the above described health, safety and cost issues with prior art distribution methods and devices.

With this object in view, the present invention provides a method of distributing flexible bags filled with beverage or liquid food product under sterile conditions, preferably through a spout or tap forming part of each flexible bag, to a consumer of said beverage or liquid food product in return for payment and comprising the following steps of distribution:

a) locating said flexible bags filled with beverage or liquid food product in a bulk transport container having capacity for a plurality of flexible bags;

b) transportation, by a commercial distributor, of the bulk transport container in which the filled flexible bags are located to a consumer of said beverage or liquid food product; and

c) unloading a required quantity of flexible bags for delivery to the consumer; and

d) delivering each flexible bag for dispensing the beverage or liquid food product contained in the flexible bag to be consumed by an end consumer, wherein, through each step, hazard and critical control points during distribution of beverage and liquid food products are minimised.

Such hazards associated with beverage or food include physical hazards, such as of impact injury, or chemical or biological hazards such as posed by toxins, microbes or other contaminants. Critical control points are points in the distribution system where such potential hazards can be minimised or avoided.

The commercial distributor may, itself, fill the flexible bags with drinking water, other beverages, such as fruit juices, milk and so on or other liquid food products using an automated filling or packaging line under sterile conditions. Such liquids may have comparable density and/or viscosity to water. It is not

intended that the flexible bags be re-used. The distribution method may be "one way". There is no requirement for the flexible bags to be recovered for re-use, thus incurring the hazards of contamination which are difficult to detect and which erode the integrity of the HACCP chain as described above. That is, the distributor "disposes", in a property sense, of the flexible bags. Storage costs and recovery costs may also be avoided. However, a customer can use a recycle or disposal service so that the material of the flexible bag can be re-used or responsibility disposed of.

Flexible bags are desirably filled through a tap, outlet, spout, valve or other dispenser forming part of the bag rather than through a form, fill and seal method which is a way of beneficially avoiding a critical control point being a residue from that sealing process. In addition, such a bag is sealed in the manufacturing process and not in the filling process. Thus, a better quality seal is achieved. Special polymer sealing devices may also be avoided, saving cost. The tap may be fitted to the bag after manufacture. Any form of flexible bag, preferably of simple, hygienic and inexpensive construction, can otherwise be used.

The commercial distributor may also mount, for example by positioning, the flexible bags in a dispenser for dispensing the drinking water, other beverage or liquid food product. The distributor may supply dispensers to customers on a rental, sale or other basis as part of the distribution service. The distributor may service the dispensers in accordance with a maintenance schedule. The dispenser, when a refrigerated cooler, is equipped with cooling means. Drinking water is typically chilled prior to customer consumption so a dispenser for drinking water would usually incorporate a chilling unit.

The bulk transport container used for transportation of the flexible bags is intended to accommodate a plurality of flexible bags while advantageously being adaptive to varying quantities of these bags in accordance with consumer demand. In other words, the bulk transport container is, advantageously, of variable capacity and/or collapsible. Packaging or "boxing" of individual flexible bags is avoided. In this way, easier and less expensive inventory management may be achieved with economics not requiring that a large minimum quantity of product, as necessary with polycarbonate bottled water distribution systems, be accepted by a distributor or sub-distributor.

A suitable bulk transport container is a bulk transport container of cubic or analogous design having smooth wall and base construction with provision for a side-gate for readier access. The construction of the container reduces risk of damage to, and contamination of, the flexible bags during transportation or storage (critical control points). The container may be made of polymer, such as High Density Polypropylene, (HDPP) suitable for use in food grade environments. Such a container may be collapsible to achieve variable capacity. The return ratio of the bulk transport container may be selected to achieve efficient use of storage space and enable economic use of transport vehicles without wastage of space on the vehicle. The containers are stackable.

The flexible bags may be filled in a central location and then distributed to distribution centres prior to distribution to multiple customers in multiple locations. Direct distribution from the central location is an alternative. A central distributor may, in a franchising system, authorise franchisees or others to distribute beverages and/liquid food products in accordance with the method of the invention. Capacity of the bulk transport container is varied in accordance with the volume of beverage or liquid food product to be delivered. The bulk transport container may be employed in collapsed state for smaller volumes and flexible bag inventory. Supervision of deliveries, inventory and payment may be conducted using a computer system.

The flexible bags may incorporate at least one handle. The handle(s) allow easier lifting and may accommodate support means to position or hold the flexible bag in a dispenser allowing substantially complete drainage of the liquid contents from the flexible bag to minimise wastage. The handle may crimp a flexible bag within a grip of the handle. The handles may allow positioning or holding of the flexible bag within the dispensers. The flexible bags may be cylindrical in shape when filled or may adopt a cylindrical shape when placed within the dispenser. The bags may accommodate any desired volume such as a volume of less than 15 litres, preferably between 10 to 15 litres, of product, the aim being to reduce hazard if the bags are dropped during transport.

Dispensers suitable for holding flexible bags may comprise a housing to locate the flexible bags during dispensing of the beverage or liquid food product and minimise contamination. The housing may include a support means, which

may co-operate with handles(s) forming part of the flexible bag, to support the flexible bag within the housing. A cylindrical housing or a housing with a cylindrical inner surface may accommodate flexible bags that adopt the shape of a cylinder when inserted into the housing. Seams of the flexible bags may be arranged such that a cylindrical shape is formed on filling of the flexible bags. A base of the housing may be angled, or otherwise configured, with respect to a vertical axis of the housing to allow substantially complete drainage of the contents of the flexible bag from the dispenser under gravity to a tap or other delivery means for water or liquid food product to a consumer. The base could be formed with a contour or funnel shape. A housing may be of flared construction to facilitate positioning of a flexible bag within the dispenser. A positioning or hanging arrangement for a flexible bag may be avoided in this manner though it may be adopted if desired. The chilling unit may be arranged to chill the base of the housing of the dispenser.

The flexible bag may be provided with, or communicated with, an outlet spout tap or valve which may co-operate with other delivery means forming part of the dispenser to deliver the beverage or liquid food product for consumption by the customer. The tap may be accommodated within a slot or bore formed within the housing of the dispenser. The tap is fed by gravity. Pumped systems in which liquid product requires to be pumped from the flexible bag are desirably and advantageously avoided. A shield, for example of polymeric or composite material, may be disposed between the flexible bag and the inner wall of the housing of the dispenser to protect the lower portion of the flexible bag and tap from damage. The shield may be located proximate the tap, valve or spout of the bag and/or slot or bore in the housing of the dispenser.

Commercial distributors may conduct any or each of the steps of the method as a single entity, a vertically integrated entity and/or through one or more parties selected from the group of their contractors, servants or agents.

Consumers may be domestic, industrial or commercial consumers. "Consumers" may be bailees of the filled flexible bags on behalf of others. That is, "consumers" as used herein may encompass owners and operators of storage facilities for storage of the filled bags on behalf of the commercial distributor. The "end consumer" is an individual or group of individuals which actually consumes

the beverage. A consumer may also comprise a community to which water or other beverages and liquid food products require to be supplied for health, hygiene or supply restriction reasons caused by war or natural disaster. Such communities may be remotely located from major population centres.

The invention may be more fully understood from the following description of preferred embodiments thereof made with reference to the drawings in which:

Figure 1a is a side view of an unfilled flexible bag used in accordance with a preferred embodiment of the distribution method of the invention;

Figure 1b is a perspective view of the tap fitted to the flexible bag of Figure 1a;

Figure 1c is a front view of a handle for the flexible bag of Figure 1a;

Figure 1d is a top view of the handle of Figure 1c;

Figure 2 is a perspective view of a transport vehicle loaded with bulk transport containers loaded with filled flexible bags in accordance with a preferred embodiment of the distribution method of the invention;

Figure 3 is a perspective section view of a bulk transport container filled with flexible bags for distribution in accordance with a preferred embodiment of the distribution method of the invention;

Figure 4 is a perspective view of the bulk transport container of Figure 3 in collapsed condition with approximately one third of maximum capacity;

Figure 5 is a perspective view of the bulk transport container of Figure 4 in expanded condition or full capacity as used in accordance with a preferred embodiment of the distribution method of the invention;

Figure 6 is a perspective view of a dispenser, being a refrigerated cooler, loaded with a filled flexible bag in accordance with a further aspect of the present invention;

Figure 7 is a perspective view of a dispenser, being a refrigerated cooler, suitable for bench top application;

Figure 8 is a perspective view of the housing of a dispenser suitable for use in accordance with a preferred embodiment of the distribution method of the present invention;

Figure 9a is a top view of the housing of Figure 8; and

Figure 9b is a front view of the housing of Figure 8;

Figure 9c is a side view of the housing of Figure 8' and

Figure 10 is a front view of a shield to protect a tap of a dispenser used in accordance with a preferred embodiment of the distribution method of the present invention.

In accordance with the distribution method of the invention, a distributor of a beverage or liquid food product procures flexible bags 10, of the form shown in Figure 1a,. Such bags 10 are of polymeric construction suitable for food grade applications, and designed to withstand ordinary handling which could involve wear. Such flexible bags 10 are fitted at tap hole 12 or formed with a valve, spout or tap through which a beverage, for example, drinking water, is directed to fill the bag. A suitable tap 20 is described in US Patent Nos 6296157 and 6360925, in the name of Scholle Corporation, the contents of which are hereby incorporated by reference. Such a tap 20 is shown in perspective in Figure 1b. It has an actuator 21 to actuate flow of liquid and a ribbed end 22 to allow socket fitting into tap hole 12 , the ribs forming the seal with a smooth internal bore of the tap hole 12. Avoidance of threading of end 22 avoids potential risk of abrasion and flow of debris into the liquid product and contaminating it. The flexible bag 10 is of rectangular shape, when flat, and is provided with a pocket 14 disposed between seams 11 of the bag 10. Transverse seams 11 and 17 and longitudinal seams 19 are formed in the bag 10. A handle 15, as shown in detail in Figures 1c and 1d, may be fitted through the pocket 14 to support the bag 10 in a dispenser or to facilitate carriage by distributor or consumer. The illustrated handle 15 is of polyethylene or propylene formed in a loop. Rod portion 15b may be inserted through pocket 14 of bag 10 and secured by fitting sleeve 15c over a barb portion 15a of rod portion 15b. Loop 15d allows the handle 15 to be positioned or hung in a dispenser, as shown in Figure 6, for example by a locator. The volume of a single bag is about 11 litres filled and weighs less than 12 kg (density of water 1.0 g/cc at ambient conditions) though bags of flexible or different volume may be catered for. Seams 16 and 17 are arranged such that, when placed in a dispenser, a "funnel" or contour will be formed at the base of bag 10 to facilitate drainage of liquid product to the base under gravity. The diagonal disposition of seams 16 illustrate how the funnel is formed. This minimises wastage of liquid product.

The distributor of drinking water uses a conventional automated packaging or filling line, to fill flexible bags 10, under sterile conditions as dictated by applicable health or quality standards, with drinking water. Other beverages or liquid food products are alternative product options. Drinking water applications are described from here on by way of advantageous example. A large number of flexible bags 10 may be filled continuously over a period of time. The packaging line may be operated continuously or intermittently and may be arranged to deliver different liquid products, that is, water, orange juice and so on during a filling run. Flexible bags 10 do not require individual packaging in containers such as boxes or other bags as familiar in the "bag in box" art. Indeed, this is very desirably avoided with cost savings. Arrangement of seams 11, 17 and 19 may enable the flexible bag 10 to adopt a cylindrical shape on filling.

Filled flexible bags 10 are located within a bulk transport container 30 as shown in Figures 2 to 5. No specific mounting is required using hangers, straps or the like. The bags 10 are neatly stacked in the container. Such a bulk container 30 is available under the trade mark GEM.CON from Chep International. Such a container 30 has smooth wall and base construction with provision for a side-gate for readier access. Slots 32 in the wall allow lifting by forklift truck as necessary. Lid 31 is detachable and may be tamper proof. The container may be made of polymer, such as High Density Polypropylene (HDPP), suitable for use in food grade environments. The construction of bulk transport container 30 helps protect flexible bags 10 from damage or contamination during transportation. Such a container 30 is collapsible with return ratio selected to achieve efficient use of storage space and enable economic use of transport vehicles without wastage of space on/in the vehicle. Container 30 has an about 3:1 return ratio allowing its volume to be reduced by up to two thirds, as necessary, and as illustrated by comparison of Figures 4 and 5 enabling more efficient use of storage space during warehousing and transportation. This may be achieved by folding of the walls of container 30 to the most appropriate capacity for the number of flexible bags 10 of liquid food product or beverage to be delivered. The detachable lid 31 is then placed into position. Flexibility in selection of transport vehicle to save transport costs is also achieved by ability to vary capacity of container 30.

A single bulk transport container 30 may accommodate 60-65 of the 11 Litre volume flexible bags. Container 30 helps to isolate bags 10 from dust and oil contamination. Such bulk transport containers 30 may then be placed in a vehicle of suitable selected storage capacity including a land transport vehicle, water transport vehicle or aircraft for transportation of the container and drinking water to any desired location. Figure 2 shows a flat top truck 50 loaded with a number of bulk transport containers 30 stacked in two layers for a large bulk delivery. Such location may be a remote location affected by war, disaster or shortage of drinking water.

A commercial distributor, being a supplier of drinking water to customers of residential, industrial or commercial kind, may transport the bulk transport containers 30 directly to, or may supervise the transportation to, customers and consumers. While the distributor may transport drinking water directly to a consumer, for example from a central location, the distributor may supply to sub-distributors or franchisees of a beverage supplier for distribution to consumers. Bulk transport containers 30 may have variable capacity adaptive to various delivery sizes. Such franchisees, included within the definition of "commercial distributor" used in this specification, may be supplied from a central location and transport economics may allow smaller quantities of beverage (drinking water) to be economically supplied to customers than is possible with a bottled water distribution system where bottle storage space may create lack of economy. Avoidance of bottles also limits safety issues for personnel lifting bottles. Flexible bags are less likely to cause injury than rigid bottles having less weight and impact.

The distributor or franchisee may assist the customer by mounting a filled flexible bag 10 containing beverage within a dispenser 40 being a refrigerated cooler. A suitable dispenser will be described below with reference to Figures 6 to 10. The commercial distributor may supply such dispenser(s) 40 to customers as part of the distribution service. The distributor may provide the customer with after-sales service directed but not limited to: nature of beverages and liquid food products available, use of dispensers, supply of dispensers and payment options. Such services may be provided by a computer which supervises management of product inventory, account payments, maintenance schedules and so on.

The commercial distributor will not plan to recover the flexible bags for re-use, but rather "disposes" of the flexible bags 10 on delivery to the consumer. In this way, hygiene problems implicit in prior bottled water distribution methods that require re-use of bottles is avoided. Adverse economics due to bottle recovery, storage and cleaning costs are also avoided. The commercial distributor disposes of the flexible bags 10 by delivery to the consumer for consumption of the beverage or liquid food product without taint or adverse effect due to recycling of the delivery container.

Figure 6 shows a dispenser 40, being a refrigerated cooler, having an internal housing 42 in which a filled flexible bag 10 is located. The flexible bag 10 filled with drinking water, adopts cylindrical shape, when located within housing 42. Provision of lateral seams 19 and transverse seam 17 of flexible bag 10 assist in achievement of the cylindrical shape. Housing 42 is located on a stand 44. Housing 42 incorporates a chilling unit 46. The chilling unit 46 may be constructed following knowledge in the refrigeration art. Housing 42 is provided with removable cover 48, the cover being provided with aesthetic design to enhance customer appeal. Both housing 42 and cover 48 are provided with a slot or bore 49 through which extends tap 20, as above described, for dispensing drinking water to a consumer.

Such dispensing of drinking water is assisted by positioning or hanging flexible bag 10 by handle 15 (see Figure 1c) by loop 15d placed on a locator or other suitable means located on the side wall of housing 42 beneath removable cover 48. Specifically, the hanging arrangement assists gravity flow of drinking water to tap 20. Gravity flow is further assisted by the "funnel" or contour formed by the arrangement of seams 16 and 17 when bag 10 is located in housing 42. The dispenser 40 is not provided with a pump to deliver water through tap 20 to the consumer. Cost and complexity may thus be avoided.

Figure 7 illustrates a dispenser 140 without a stand 44. In this case, the dispenser 140 is an ambient dispenser located on a bench top 60.

Figures 8 and 9 provide more detail of the construction of housing 42. Housing 42 is here illustrated to be of cylindrical section but open, along much of its length, along a dispensing segment 43 of the housing 42. A slot or bore 49 is located at a base 42a of the housing 42 but with a sufficient rim or wall 47 to

contain a flexible bag 10. Base 42a of housing 42 is angled, at between 15-20°, to horizontal at the bottom slot or bore 49, to provide a downward gradient from the rear wall 42b of housing 42 toward slot or bore 49. This also assists dispensing of drinking water because the flexible bag 10 Thus, bag 10, when in dispensing position, may have a sloping "floor" that facilitates drainage of drinking water toward slot or bore 49 and tap 20 for dispensing to a consumer. A shield 70, of planar and arcuate construction, and as shown in Figure 10, may be disposed within rim 47 between tap 20 and tap hole 12 of bag 10 to prevent wear or piercing of flexible bag 10 at this point. Aperture 71 of shield 70 is fitted over actuator 21 after the tap 20 is fitted to flexible bag 10 thus holding it in position proximate the tap 20 protecting the flexible bag 10 in this region. Cuts in aperture 71 facilitate such positioning. Shields 70 may be of a polymeric or composite construction. Shields 70 and handles 15 may be supplied in separate bags or kits, which may also be conveyed in bulk transport container 30, and may be installed by the distributor. Shield 70 is shown installed in Figure 6 in dashed outline.

Base 42a of housing 42 may be arranged relative to a chilling unit 46 such that base 42a is chilled, thus chilling drinking water within flexible bag 30. Chilling unit 46 is only included as required. Refrigeration coils may perform the chilling duty. Additional chilling may be required for bags 10 of greater volume.

Once bag 10 is positioned within housing 42 of dispenser 40 and removable cover 48 is placed into position, the dispenser 40 can be operated and tap 20 actuated by actuator 21 to deliver drinking water to the consumer. If desired, a bag 10 may be pre-chilled in a refrigerator prior to placement in dispenser housing 42.

Modifications and variations to the distribution methods and devices for distributing and dispensing beverages and liquid food products in accordance with the present invention may be apparent to the skilled reader. Such modifications and variations are deemed within the scope of the present invention. In particular, any liquid food product or beverage may be distributed and dispensed in accordance with the methods and devices of the invention.